

# PATENT SPECIFICATION



Application Date: July 29, 1941.

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## PROVISIONAL SPECIFICATION

### Improvements in or relating to Tyre Building Machines and Cores therefor

We, DUNLOP RUBBER COMPANY LIMITED, a British Company, of 1, Albany Street, London, N.W.1, and HARRY WILLSHAW, a British subject, of the aforesaid Company's Works at Fort Dunlop, Erdington, Birmingham, in the County of Warwick, do hereby declare the nature of this invention to be as follows:—

10 This invention relates to tyre building machines and cores therefor. In the term "core" we include any appropriate form of structure on which tyres are built-up.

15 According to this invention driving co-action between the driven spindle of the machine and the said core is effected by means of a clutch-like arrangement, for example of the claw or dog type, adapted to be locked in engagement while the core 20 is in operative position on the machine, this providing a simple, robust and positive driving coaction which is economical in first cost and maintenance and easy, quick and foolproof in operation.

25 It allows for the core to be readily removed from the machine and thus said core can be taken to a place apart for the performance of operations ancillary to the tyre building operation, e.g. dis-assembly or collapse of the core, removal of the 30 built-up tyre, and re-assembly of the core. This facilitates flow-production and enables the machine to remain in constant productive use on the major operation of 35 tyre building, thereby avoiding the holding-up of the machine pending the performance of any ancillary operations such as those referred to.

40 Various other provisions of the invention will become apparent as the description proceeds, for example improved provision for altering the width of the core and particular means for securing the parts of the core together. There will 45 also emerge a further aspect of the invention, very largely complementary of the aspect described above, whereby the core is of wheel-like construction embodying a central tubular hub with which the remainder of the core assemblage forms a 50 self-contained unit, the whole being preferably adapted for retention on the

machine by a single central bolt passing axially through said hub.

We will now describe one particular 55 embodiment of the invention.

The core comprises a number of loose segments which go together to form the complete annulus of the core. Each segment has three main longitudinal parts, 60 viz. a central part and two side parts which can slide laterally on the central part to alter the width of the core, said side parts being hereinafter called bead sectors.

65 Between the inner circumferential edges of the centre part and the bead sectors respectively, a series of making-up rings are securable, said rings varying in size and/or number with the width variation required. 70

Making-up provision may also be associated with the coaction between spindle and core, and this will be referred to later. 75

As already indicated the structure as a whole may be regarded as analogic to a wheel, the assemblage of parts we have just described being the rim, while the spindle is the shaft upon which said wheel 80 rotates. The completion of the analogy requires a hub and spokes: the latter are provided by a pair of apertured discs of which the outer peripheries engage the edges of the bead sectors and the inner 85 peripheries engage a tubular member which pulls them together, said tubular member comprising the "hub" of our wheel analogy. The engagement between said discs and the bead sectors preferably 90 comprises some form of coned coaction which gives a good and firm centering grip.

Said hub may have a flange or integral nut which bears against the front disc, 95 the other end of said hub screw-threadedly engaging the bore of the back disc. By the back disc we mean the one nearest the machine, and by the front disc we mean the one facing outwardly of the 100 machine. As the tube is screwed home into the back disc the flange bears against the front disc and thus the two discs, i.e. "the spokes" of our wheel analogy, are

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pulled laterally together, thereby to secure the "rim" in place, thus making a complete and rigid "wheel".

As to the manner of associating the core with the spindle: this involves the clutch-like arrangement according to the invention, the same in one form being embodied as follows:—

Towards its free end the spindle is formed with a flange which has two diametrically opposed slots formed through its thickness: the back disc aforesaid is formed with an annular depression of a diameter slightly greater than that of said flange, and having two inwardly projecting diametrically opposed lugs complementary to the slots on said flange. Driving coaction between core and spindle is effected by the lugs on the core engaging the slots in the flange on the spindle.

Projecting forwardly of said flange there is a reduced extension of the spindle which is internally screw-threaded: when the core is in position a bolt (the "single central bolt" aforesaid) is passed axially

down the "hub" of the core and screwed into said extension until the head of said bolt bears against the flange or nut of said hub and so secures the core firmly in position.

It is required that the setting distance of the core in relation to the machine, i.e. the distance which determines the position of the centre line of the core, should remain constant and thus, as already indicated, some adjustment of spacing provision is incorporated into the coaction between core and spindle.

Said provision preferably comprises washers adapted to be disposed between the front face of the flange on the spindle and the inner face of the depression in the back disc, the number or thickness of said washers varying according to the number or thickness of the spacing rings used between the head sectors of the core.

Dated this 25th day of July, 1941.

W. BOND,

Acting for the Applicants.

## COMPLETE SPECIFICATION

### Improvements in or relating to Tyre Building Machines and Cores therefor

We, DUNLOP RUBBER COMPANY LIMITED, a British Company, of 1, Albany Street, London, N.W.1, and HARRY WILLSHAW, a British subject, of the aforesaid Company's Works at Fort Dunlop, Erdington, Birmingham, in the County of Warwick, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to tyre building machines and cores therefor. In the term "core" we include any appropriate form of structure on which tyres are built-up.

According to this invention we provide an assemblage comprising the core of a tyre building machine and a driving shaft for said core, wherein driving engagement between core and shaft is effected by means of inter-engaging parts on said core and shaft respectively, said parts preferably comprising a clutch-like arrangement of the dog type engaging at two or more spaced points, and wherein said core is retained in operative position on the shaft and the said inter-engaging parts are locked in driving engagement by means of a single central screw.

This provides a simple, robust and positive assembly which is economical in first

cost and maintenance and easy, quick and foolproof in operation. It allows for the core to be readily removed from the machine and thus said core can be taken to a place apart for the performance of operations ancillary to the tyre building operation, e.g. dis-assembly or collapse of the core, removal of the built-up tyre, and re-assembly of the core. This facilitates flow-production and enables the tyre building machine to remain in constant productive use on the major operation of tyre building, thereby avoiding the holding-up of the machine pending the performance of any ancillary operations such as those referred to.

Various other provisions of the invention will become apparent as the description proceeds, for example improved provision for altering the width of the core. There will also emerge a further feature of the invention whereby the core is of wheel-like construction embodying a central tubular hub with which the remainder of the core assemblage forms a self-contained unit.

In order that the said invention may be easily understood and readily carried into effect, the same will now be described with reference to the accompanying drawings in which:—

Figure 1 is a cross sectional side view

of the assemblage according to our invention; and

Figure 2 is a front view thereof with the shaft removed.

5 The core comprises a number of loose segments 10 which go together to form the complete annulus of the core. Each segment has three main longitudinal parts, viz. a central part 11 and two side parts 12 and 13 which can slide laterally on the central part to alter the width of the core, said side parts being hereinafter called bead sectors.

Between the inner circumferential 15 edges of the centre part and the bead sectors respectively, a series of making-up shims 14 are securable, said shims varying in size and/or number with the width variation required. Making-up provision 20 may also be associated with the coaction between shaft and core, and this will be referred to later. To bridge the gaps 15 arising out of adjustment there is a cover 16 fixed to the centre part 11 and extending over the edges of the bead sectors 12 and 13 as shown.

The bead sectors 12 and 13 are secured on the central part 11 by bolts 17 and 17a. The bolts 17 anchor the edges of the bead sectors to a flange of the said part 11, slots being provided in said flange to accommodate adjustment. The bolts 17a extend laterally from said central part, through the shims, and into the bead sectors, these 35 bolts serving the further purpose of retaining said shims in place.

As already indicated the structure as a whole may be regarded as analogic to a wheel, the assemblage of parts we have 40 just described being the rim, while the axis of the driven shaft 18 attached to the tyre building machine is the axis upon which said wheel rotates. The completion of the analogy requires a hub and spokes; the latter are provided by a pair of radially disposed members 19 and 20 of which the shaped outer peripheries 21 and 22 engage the edges of the bead sectors, and the flanged inner peripheries 23 and 24 engage 50 a tubular member 25 which pulls them together, said tubular member comprising the "hub" of our wheel analogy. The engagement between the members 19 and 20 and the bead sectors preferably comprises some form of coned coaction as shown which gives a good and firm centering grip.

Said hub may have an integral nut and flange formation 26 which bears against the flange 23 of the front member 19, the other end of the said hub screwing into the flange 24 of the back member. As the hub is screwed home into the back member the flange 26 bears against the front 65 member and thus the two members, i.e.

"the spokes" of our wheel analogy, are pulled laterally together, thereby to secure the "rim" in place, thus making a complete and rigid "wheel".

The back member of course is the one 70 nearest the machine and the front member the one facing outwardly of the machine; the shaft 18 is supported by and driven from said machine via a flange 27 which is bolted to a complementary driven 75 flange on the machine.

As to the manner of associating the core with said shaft; this involves the parts according to the invention having inter-engaging driving relation, said 80 parts being preferably embodied in a form resembling a dog clutch as follows:—

Towards its free end the shaft 18 is formed with a flange 28 which has two diametrically opposed slots 29 and 30 85 formed through its thickness; the member 20 is formed with an annular depression 31 of a diameter slightly greater than that of said flange, and having two inwardly projecting diametrically opposite lugs 32 and 33 complementary to the slots 90 on said flange. Driving coaction between core and shaft is effected by the lugs 32 and 33 on the core engaging the slots 29 and 30 in the flange 28, a good fit being 95 preferably provided.

As will be observed the arrangement provides driving engagement at two spaced points, and this gives a robust and positive drive which is also readily engaged 100 and disengaged. Projecting forwardly of the flange 28 there is a reduced extension 34 of the shaft which extension is internally screw-threaded at 35: when the core is in position a screw or bolt 36 (the 105 "single central screw" aforesaid) is passed axially down the "hub" or tubular member 25 of the core and screwed into said extension until the head 37 of said bolt bears against the nut 26 of said 110 hub and so secures the core firmly in position.

It is required that the setting distance of the core in relation to the machine, that is the distance  $x$  which determines the 115 position of the centre line 38 of the core, should remain constant and thus, as already indicated, some adjustment of spacing provision is incorporated into the coaction between core and shaft. 120

Said provision preferably comprises a pair of distance pieces 39 screwing into the flange 28 and abutting against the inner face of the depression 31; washers are preferably used between the nuts 40 125 of said distance pieces and the front face of the flange 28 so that the said distance pieces can be locked in position by the nut gripping onto said washers. The number or thickness of washers used varies accord- 130

ing to the number or thickness of the spacing rings or shims 14 used between the bead sectors of the core.

- 5 The hole 41 is merely to accommodate a part of the bead setting ring structure, 42 being a bearing bush in which said part fits: said structure comprises a ring which locates the bead in correct position on the tyre casing, and a carrier for said ring, said carrier having a central spindle which fits in said bush 42.

10 Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. An assemblage comprising the core of a tyre building machine and a driving shaft for said core, wherein driving engagement between core and shaft is effected by means of interengaging parts on said core and shaft respectively, and wherein the core is retained in operative position on the shaft and the said interengaging parts are locked in driving engagement by means of a single central screw.
2. An assemblage as in Claim 1 wherein said interengaging parts comprise a clutch-like arrangement of the dog type engaging at two or more spaced points.
3. An assemblage as in either of the preceding Claims wherein said shaft has an extension internally screw-threaded to take the central locking screw aforesaid.
4. An assemblage as in Claim 3 wherein the core comprises a wheel-like self-contained unit with a central tubular hub

which fits on the shaft extension aforesaid and embraces the said central screw.

5. An assemblage as in Claim 4 wherein the core comprises a series of separate segments held together in circumferential relationship by a pair of radially disposed members adapted to be submitted to axial pressure by means of said hub.

6. An assemblage as in Claim 5 wherein said hub screws into one of said members and is flanged to abut against the other.

7. An assemblage as in any of the preceding Claims wherein the core is adapted to be adjustable in width.

8. An assemblage as in Claims 5, 6 and 7 wherein the segments each comprises a central part and two side parts, and wherein width-adjustment is provided by the use of shims between said parts and by the tubular hub.

9. An assemblage as in Claim 7 and Claim 8 wherein means are provided for altering the distance between opposing faces of the interengaging driving parts aforesaid.

10. In an assemblage as in any of the preceding Claims a core substantially as herein described with reference to the accompanying drawings.

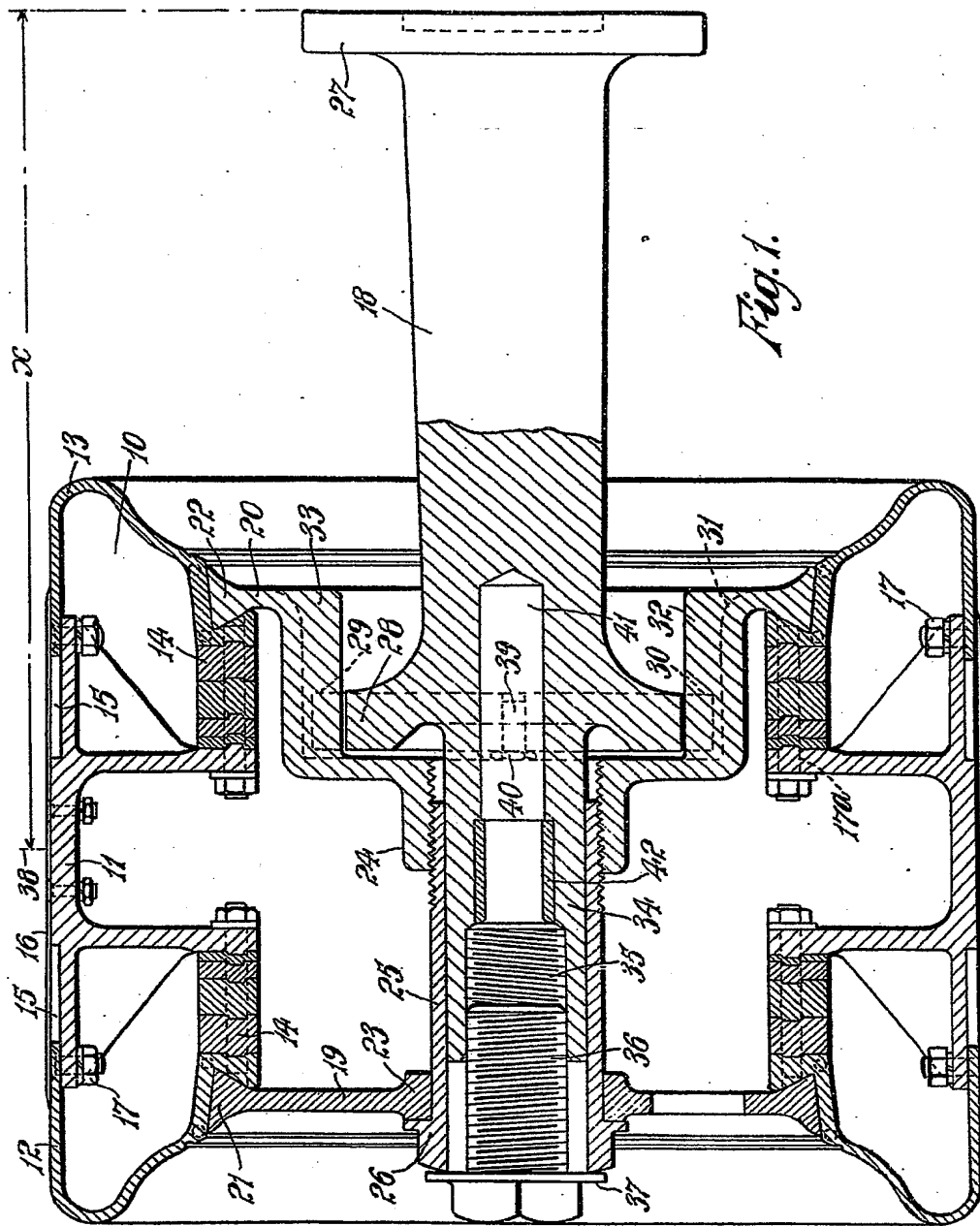
Dated this 24th day of July, 1942

W. BOND,

Acting for the Applicants.

Reference has been directed, in pursuance of Section 8, sub-section (2), of the Patents and Designs Acts 1907 to 1942 to Specification No. 544,745.

[This Drawing is a reproduction of the Original on a reduced scale.]



Malby & Sons, Photo-Lith.

[This Drawing is a reproduction of the Original on a reduced scale.]

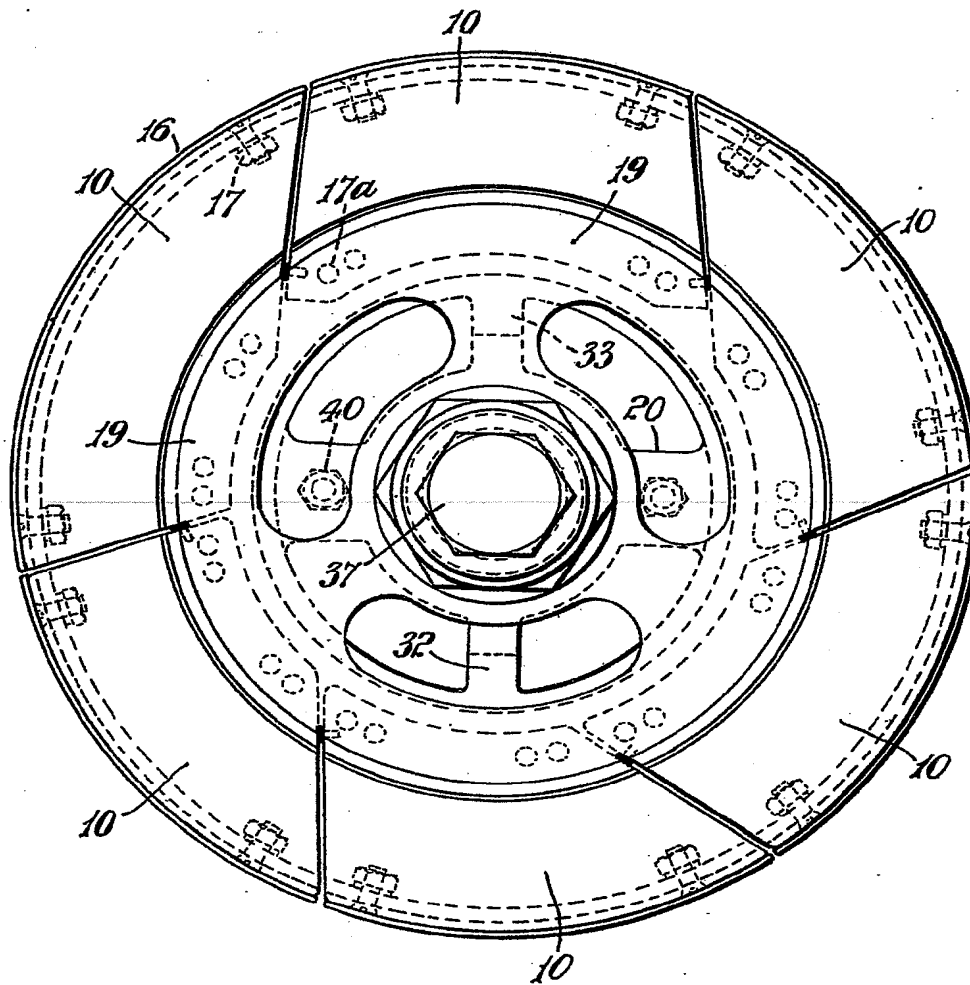


Fig. 2.

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